ABSTRACT

A method for detection and monitoring of hydrocarbon deposits by measuring infrasonic spectral characteristics of microseismic noise of the Earth. The method is used onshore and offshore for detection of hydrocarbon deposits and for monitoring of producing oil and gas fields and subsurface storage of natural gas. In one method of the invention, at least one receiver of seismic vibrations capable of recording vibrations in the infrasonic range is placed over an area being surveyed. The spectral characteristics of the microseismic noise of the Earth recorded within a 2 to 5 Hz frequency range are used as a "passive" information signal. A hydrocarbon deposit is determined by the presence of a spectral anomaly on a spectrum of the passive information signal relative to a spectrum of an information signal from the area known not to contain hydrocarbons. In another method of the invention, in addition, seismic vibrations are generated using a seismic vibrator over an area being surveyed. An "active" information signal is recorded during the generation of seismic vibrations. A hydrocarbon deposit is determined by the presence of a spectral anomaly on a spectrum of the active information signal relative to a spectrum of the passive information signal recorded at the same point. The invention provides for a direct method of detection of hydrocarbon deposits onshore and offshore.